

Evidences of active continental arc setting from Lesser and Higher Himalayan granitoids, Bhutan Himalaya

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There is a lot of hue and cry on the origin and provenance characteristics of Lesser Himalaya and Higher Himalayan rocks, earlier it was assumed that they are passive margin sediments deposited on Indian oceanic front but in the last 3 decades, geochemical and isotopic analysis had changed the scenario, which indicates active continental setting instead of passive margin sediments means the geochemical study has great significance to work out recent active tectonic of Himalaya which is poorly understood. Granitoids and granitic gneisses have been distinguished in relation to understand the heterogeneity of Himalayan Orogenesis. My work is focused on geochemical and isotopic (Sm-Nd) analysis of Lesser Himalaya (Shumar Formation) and Higher Himalayan granitoids of Bhutan Himalaya from the Kuru Chu and Mangde Chu catchments, these granitoids and orthogneisses supports active continental setting theory.

On ASI plot both shows S-Type tectonic setting, and plots like TiO_2 vs. Zr, Rb/Sr vs. Sr, FeOT against TiO_2 and SiO_2 versus Nb/Y represents that they have two different sources which are deposited on Indian oceanic front and are influenced by metamorphism, deformation, thrusting and upliftment. On pearce tectonic plots these rocks fall within the range of volcanic arc granite and orogenic granite, to discriminate the characteristics of Lesser Himalayan and Higher Himalayan granitoids Rb/Zr vs. Nb and Rb/Zr vs. Nb plots were made and they clearly represent that Lesser Himalayan sequences belongs to active continental margin whereas Higher Himalayan sequences has some characteristics of active continental margin with some pre-arc and post-arc sources. Sm-Nd isotopic data also suggest that kyanite rich paragneisses of HHC represents the characteristics of Indian passive margin sediments and orthogneisses of Lesser and Higher Himalaya represents signatures of Active continental margin in which the Lesser Himalaya gneisses has older arc source and HHC has younger sources. As a result of this work it has been seen that geochemical and isotopic signature of Shumar orthogneisses of Lesser Himalaya has a definite range of T-Model age which indicates that it has a single source, whereas granitoids of HHC shows a wide range in their geochemical and isotopic signature, indicates that it has multiple sources during deposition and was tectonically consolidated with the northern margin of India, placing it structurally above the Lesser Himalayan Sequence, and later on it has metamorphosed and intermixed with passive margin sequences of northern margin of Indian Sub-continent and goes up to granulite facies of metamorphism.

Biography

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